

A NEW SPECIES OF *CAREX* (SECT. *OLIGOCARPAE*)
FROM THE EDWARDS PLATEAU OF TEXAS

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ABSTRACT

Carex edwardsiana, a new species of sect. *Oligocarpae*, is described and its diagnostic features, habitat and relation to other endemics of the Balcones Escarpment of the Edwards Plateau of Texas are discussed. This species has previously been considered to fall within the variability known for *C. oligocarpa*, but it is morphologically distinct and geographically isolated from this more northern and eastern species.

KEY WORDS: *Carex*, Cyperaceae, systematics, Texas, Edwards Plateau.

In the process of an intensive field study of the distribution and ecology of the Cyperaceae of Texas, we have noted for several years that the central Texas entity identified as *Carex oligocarpa* Schkuhr. does not closely resemble specimens of that species from northern and eastern states. The discussion of this entity (as *C. oligocarpa*) by Dr. Marshall Johnston noted some of these differences, and he stated that it should perhaps not be referred to *C. oligocarpa* (Correll & Johnston 1970). However, this species had rarely been collected in Texas before 1970, and the consistency of its differences was not known. After making field observations at several sites and examining a series of collections made after the Texas flora was published, we are convinced that it represents a distinct, previously undescribed species.

***Carex edwardsiana* Bridges & Orzell sp. nov.** (Figure 1). TYPE: UNITED STATES. Texas: Travis County, mesic colluvial limestone slope forests with rock outcrops in valley of Barton Creek, ca 2 mi upstream from Barton Springs in Zilker Park, and 2.5 mi upstream from Colorado River,

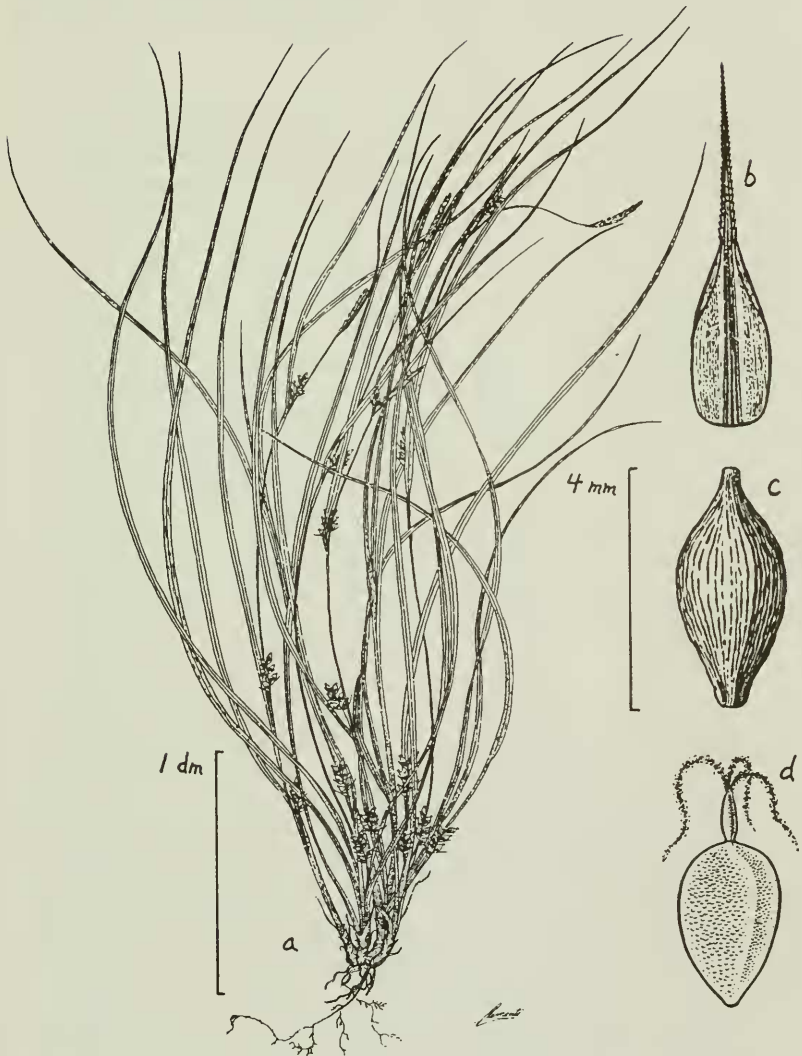


Figure 1. *Carex edwardsiana* Bridges & Orzell (from type).
a. Habit; b. Lower pistillate scale; c. Perigynium;
d. Fruit with attached style and stigmatic branches.

ca 0.5 air mi NE of Loop 360 bridge over Barton Creek, Oak Hill 7.5' Quad, 30° 14' 55" N, 97° 47' 47" W, 17 Apr 1989, Orzell & Bridges 9280 (HOLOTYPE: TEX!; Isotypes: GH!, MICH!, MO!, NCU!, NY!, SMU!, US!).

Planta perennis, 25-35 cm longa, laxe vel dense cespitosa, vel breviter crasse rhizomatosa, foliis principalibus culmo longioribus. Cataphylla infra folia oblonga vel ovata, ca 5-40 mm longa, multicostata, distaliter carinata, acuta, brunneola vel fuscopurpurea. Pseudoculmi laterales steriles foliosissimi. Folia principalia approximata; vaginae foliorum brevissimae, pallide albovirides, saepe rubropunctatae, laeves, ventraliter subscariosae; ligula erecta squamiformis, angusta, ca 1 mm lata, hippocrepica; laminae patulae, compressae, anguste lineares, 20-40(-65) cm longae, 2-4 mm latae, margine scabridulae, pagina valde nervosa, glabra. Spicae 2-5, lineares vel anguste oblongae, remotae, ad basin plantae confertae. Spica ultima mascula, anguste lineari-ellipsoidea, 1.8-2.5 cm longa, 2-3 mm crassa, straminea, sessilis vel pedunculo 8 cm usque longo elevata, ultimam spicam femineam multo superans vel ei brevior. Bractea spicae masculae sine vagina, 5-50 mm longa; glumae masculae 4-5 mm longae, zona costali angusta, viridi, matrice scariosa, lata, alba; antherae 2.5-3 mm longae. Pedunculi spicarum feminearum crassi, filiformes vel lineares, scaberuli, 4-20 mm longi, infimi longissimi, pro parte maxima in vaginis bracteis inclusi; bractee spicae feminae foliaceae, infimae longissimae, vaginis 4-15 mm longis, laminis erectis, spicas et culmos multo superantibus, saepe foliis longissimis aequilongis. Spicae laterales omnino femineae, (3-)7-9 florum, 7-20 mm longae, 4-7 mm crassae, floribus approximatis, rhachidi recta vel leviter fractiflexa; glumae femineae ovatae vel lanceolatae, cuspede aut mucrone incluso (2-)4-5(-11) mm longae, 1-1.5 mm latae, zona costali viridi, 3-costata, de latere scariosae, albidae, ad apicem contractae vel retusae, apice omnes valde cuspidatae, cuspede valde scabro, in ultimis glumis abbreviato. Perigynia obovoidea vel ellipsoidea, 4.5-5.0 mm longa, 2.0-2.2 mm lata, obscure vel acute trigona, faciebus in medio planis vel leviter concavis, subtiliter impressinerviis, viridibus vel brunneolis, rostro brevi (0.5 mm), recto vel leviter ad angulum 30° excurvato. Achenia sessilia aut stipite ad 0.1 mm longo insidenti, obovoidea, quasi sine rostro, 2.5-3.0 mm longa, 1.5-2.0 mm lata, trigona, arcte inclusa, minute papillosa, cum styli basi tumida articulata.

Perennial, 25-35 cm long, loosely to densely cespitose, or with stout, short rhizomes, the principal leaves longer than the culms. Cataphylls below leaves oblong to ovate, ca 5-40 mm long, multicostate, distally carinate, acute, brown

or reddish brown. Pseudoculms lateral, sterile, very leafy. Principal leaves approximate, sheaths short, pale greenish white, often with scattered reddish dots, smooth, ventrally subscarios; ligule an erect narrow scale, ca 1 mm wide, horseshoe shaped; blades spreading, flattened, narrowly linear, 20-40(-65) cm long, 2-4 mm wide, marginally scabridulous, surface strongly nerved, smooth. Spikes 2-5, oblong-linear, borne remotely on culms but densest at base of plant. Terminal spike male, narrowly ellipsoid-linear, 1.8-2.5 cm long, 2-3 mm thick, stramineous, sessile or on a peduncle to 8 cm long, from shorter than to much overtopping the upper female spike. Male spike bract sheathless, 5-50 mm long, male scales 4-5 mm long, white hyaline to stramineous with green midnerve; anthers 2.5-3 mm long. Peduncles of female spikes stout, filiform to linear, scaberulous, 4-20 mm long, the lowest longest, mostly included in the bract sheaths; female spike bracts as leaves, the lowest longest, with sheaths 4-15 mm long, the blades erect, much exceeding the spikes and culms, often as long as the longest leaves. Lateral spikes all female, (3-)7-9 flowered, 7-20 mm long, 4-7 mm thick, flowers approximate, rachis straight to slightly zigzag; female scales ovate to lanceolate, including cusp or mucro (2-)4-5(-11) mm long, 1-1.5 mm wide, the costal zone green, 3-ribbed, the sides scarious, white, tapered to retuse at apex, the tips of all scales strongly cuspidate, cusps strongly scabrous, with cusp length reduced in upper scales. Perigynia obovoid-ellipsoid, 4.5-5.0 mm long, 2.0-2.2 mm wide, obscurely to sharply trigonous, the faces at middle flat to slightly concave, finely impressed nerved, greenish to brownish, the beak short (0.5 mm), straight to slightly excurved, to a 30 degree angle. Achene sessile or with a stipe to 0.1 mm long, obovoid, essentially beakless, 2.5-3.0 mm long, 1.5-2.0 mm wide, trigonous, tightly included, minutely papillose, jointed with the swollen style base.

Additional collections examined (Paratypes): UNITED STATES. Texas: Kendall Co., mesic, wooded, N facing rocky slope on S bank of Guadalupe River, from W boundary of Guadalupe River State Park to at least 500 ft E; Anhalt 7.5' Quad, 29° 52' 22" N, 98° 29' 48" W, 18 Apr 1989, *W.R. Carr 9557* (SMU,TEX). Medina Co., mesic, rocky, wooded, N facing slope on S bank of Bandera Creek, ca 500-1000 ft E of W boundary of Hill Country State Natural Area; Twin Hollow 7.5' Quad, 29° 37' 12" N, 99° 12' 17" W, 20 Apr 1989, *W.R. Carr 9595* (SMU,TEX). Travis Co.: same as type locality, 7 Apr 1986, *Bridges 86-175* (SMU,TEX); 25 Apr 1987, *Bridges 87-140* (TEX); 30 Mar 1989, *Orzell & Bridges 8809* (GH,MICH,MO,NCU,NY,TAES,TEX); 30 May 1989, *Orzell & Bridges 10145* (SMU,TEX); seasonally mesic upper N facing slope forest at head of ravine on N side of Mountain Trail, ca 0.4 mi N of Comanche Trail, ca 2.5 air mi NW of int FM 2222 and FM 620 at Four Points, between Cypress Creek Arm and main pool of Lake Travis, Mansfield Dam 7.5' Quad, 30° 25' 07" N, 97° 53' 16" W, 8 Apr 1989, *Orzell & Bridges 9062* (MICH,MO,NCU,SMU,TEX); wooded slopes in ravine, E end of 200 ft limestone cliff on S bank of Bull Creek, SE of Loop 360, 0.5 mi NE of Lakewood

Drive; Jollyville 7.5' Quad, 30° 22' 38" N, 97° 46' 22" W, 9 Apr 1983, W.R. Carr 4654 (SMU); rocky bank of ephemeral creek in cedar woods ca 2700 ft NE of summit of Cat Mtn., Austin West 7.5' Quad, 30° 21' 24" N, 97° 46' 38" W, 1 May 1983, W.R. Carr 4794 (SMU,TEX); in stream bottom, in shade of walnuts and hackberries, between limestone ridges ca 0.75 mi NNW of int Loop 360 and Lakewood Drive, Jollyville 7.5' Quad, 30° 22' 57" N, 97° 47' 28" W, 8 Apr 1984, W.R. Carr 6009 (SMU,TEX); in cedar/Texas oak woods on steep slope in limestone ravine, ca 1200 ft W of Spicewood Springs Rd, ca 0.7 mi S of Loop 360, Jollyville 7.5' Quad, 30° 22' 33" N, 97° 45' 58" W, 14 Apr 1984, W.R. Carr 6010 (SMU,TEX); along banks of ephemeral stream in small cedar-wooded ravine, ca 2500 ft NW of int Loop 360 and N branch of Spicewood Springs Rd, Jollyville 7.5' Quad; 30° 23' 15" N, 97° 46' 40" W, 22 Apr 1984, W.R. Carr 6042 (SMU).

Carex edwardsiana is locally abundant in moist, rich, black, clayey to loamy soil rich in humus, mostly in protected slope and ravine forests in the Eastern and Southern Balcones Escarpment sections of the Edwards Plateau of Texas. These forests are similar to the north slope deciduous forests described by Van Auken (1988) and the canyon flora of Palmer (1920). The rich, calcareous, seasonally moist soils support many species at their western and southern range limits, as well as providing habitat for numerous local and regional endemics. Canopy trees associated with *C. edwardsiana* include *Quercus buckleyi*, *Q. durandii*, *Q. muhlenbergii*, *Juniperus ashei*, *Fraxinus texensis*, *Celtis reticulata*, *Carya illinoensis* and *Prunus serotina*. Shrub and woody vine associates include *Aesculus pavia*, *Garrya lindheimeri*, *Lindera benzoin*, *Rhus radicans*, *Callicarpa americana*, *Ungnadia speciosa*, *Parthenocissus quinquefolia*, *Morus rubra*, *Cornus drummondii* and *Juglans microcarpa*. The herb layer at some sites includes the local endemics [primarily the PC1 endemics of Amos & Rowell (1988)] *Anemone edwardsiana*, *Commelinantia anomala*, *Euphorbia roemeriana*, *Onosmodium helleri* and *Ruellia drummondiana*, and the regionally endemic *Carex planostachys*, *Desmodium psilophyllum*, *Dichanthelium pedicellatum*, *Hedeoma acinoides*, *Mirabilis lindheimeri*, *Nolina texana*, *Polytaenia texana*, *Salvia roemeriana* and *Tetragonotheca texana*. More wide ranging herb associates, generally at their western limit, include *Aristolochia serpentaria*, *Aquilegia canadensis*, *Arisaema dracontium*, *Aster texanus*, *Chasmanthium latifolium*, *Geum canadense*, *Parietaria obtusa*, *Senecio obovatus* and *Verbesina virginica*. *Carex edwardsiana* is closest morphologically to *C. oligocarpa*, to which it has previously been referred. Both have the trigonous, basally tapering, apically restricted or beaked perigynia with numerous finely impressed nerves characteristic of section *Oligocarpace*. In general aspect, *C. edwardsiana* differs from *C. oligocarpa* in having shorter culms with more basally clustered spikelets and leaves usually much exceeding the culms. It is not as densely caespitose as *C. oligocarpa* and forms clumps from 10-20 cm in diameter by means of short, stout rhizomes. It tends to have more perigynia per

spikelet, with these more closely clustered on the spikelet axis. The perigynia and achenes are larger than those reported for *C. oligocarpa*. The achene lacks an apiculus, and is not as long stiped as *C. oligocarpa*. *C. oligocarpa* also has reddish zones on the staminate scales, while those of *C. edwardsiana* are all white hyaline. The following key can serve to distinguish these two species.

Plants densely cespitose, to 50 cm tall, culms about the length of the longest leaves, spikelets mostly in the upper half of the culms; perigynia averaging 4 per spikelet (-8 in some cases), overlapping each other less than half their length; perigynia 3.5-4 mm long, achene 2.0-2.3 mm long, distinctly stipitate and apiculate; scales of the staminate spike with white to reddish brown with green midnerve *Carex oligocarpa* Schkuhr.

Plants loosely to densely cespitose, often forming clumps to 10-20 cm in diameter by short, stout rhizomes, 25-35 cm tall, longest leaves much exceeding the culms, spikelets mostly in the lower half of the culms, densest in the lowest 5 cm of the culm; perigynia averaging 7 per spikelet (fewer on upper spikelets or on poorly developed culms), overlapping for half of their length; perigynia 4.5-5.0 mm long, achene 2.5-3.0 mm long, essentially sessile and beakless; scales of staminate spike white hyaline with green midnerve *Carex edwardsiana* Bridges & Orzell

The nearest approaches of *C. oligocarpa* to the range of *C. edwardsiana* appear to be in Dallas and Cooke counties in north central Texas, and perhaps in western Louisiana or extreme eastern Texas. Both of these regions are about 320 km from the nearest locations of *C. edwardsiana*. Although restricted to specific, isolated microhabitats, *Carex edwardsiana* seems to be frequent within this habitat and probably occurs in numerous localities in the Eastern and Southern Balcones Escarpment Sections of the Edwards Plateau. It may occur in all the counties between Travis and Medina and perhaps extends slightly farther to the north and west. Its total distribution is expected to follow the pattern of the other Balcones Escarpment endemics or near endemics (Amos & Rowell 1988), which are a conspicuous component of the vernal flora of these geographically isolated mesic ravines.

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